

Social connectedness through ICT and the influence on wellbeing : the case of the CareRabbit

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Abstract. The CareRabbit has been introduced as a technological innovation in the care for children, enabling family and friends to stay in touch while the child is hospitalized. This study addresses influence of this innovation on the wellbeing of the children, and uses the validated KINDL questionnaire, eliciting information from children and parents at the end of hospitalization. A baseline and an experimental measurement are compared. The children in the CareRabbit group scored slightly higher on the KINDL questionnaire than children in the control group. For young children (age 4-7) the difference was large. Initial findings indicate that CareRabbit has a positive influence on wellbeing, although sample size and measured differences limit the support for this conclusion. The measured difference suggests that CareRabbit may be more valuable for younger children.

Keywords: Innovation, Information and Communication Technology, Evaluation, Wellbeing

1. Introduction

The CareRabbit (ZorgKonijn) is an e-health device that can be used to play messages (e.g. text, mp3) sent to it through the Internet. The device² itself, depicted in figure 1 is a 23 cm high white rabbit with rotating ears and lights in its belly.



Figure 1. The CareRabbit e-health device.

The device is deployed in children's departments in hospitals. Its aim is to make children feel comfortable and make their stay more pleasant, by keeping in touch with

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² The device is called a Nabaztag, marketed independently by Mindscape France.

friends and family. One of the questions in developing the CareRabbit further was formulated by IBM as follows: What is the value of the CareRabbit for its users and how can it best be used in hospitals? This paper addresses the value of the CareRabbit in terms of the wellbeing of the hospitalized children. Rather than measuring the perception of children and their parents regarding the technology used, we decided to employ a validated instrument to actually measure the wellbeing of the child.

The e-health device fits in a 'Family-centred care' (FCC) approach of hospitals. FCC means that during a hospital admission, care is planned by the health staff around the whole family, not just the individual child, with key-concepts like 'partnership in caring' and 'encouragement of family-to-family/peer support'. The aim of this approach is to minimize the impact of the child's admission on all the family members and the child's emotional trauma and to assist in recovery [1, 2]. Several studies show that social connectedness is important for a person's wellbeing and health. Sadlo [3] states: "the experience of social connectedness makes a more important contribution to an individual's subjective wellbeing, than the mode of communication". Especially family members and friends can give us a feeling of belonging, understanding and being cared for. Having a social network for supports can buffer against stress, develop social skills [4], and leads to higher levels of life satisfaction and self-esteem [5]. Even the frequency of the contact with family and friends has been positively related to wellbeing [6]. Research shows that people use technology-based modes of communications as a supplement to their face-to-face communication, and not as a replacement [3]. The CareRabbit will most likely be used to supplement hospital visits.

This research was part of a larger project directed at the implementation of the CareRabbit in Dutch hospitals, in itself a complex, multi disciplinary problem with a practice-oriented design. The project's aim is to develop a business model for this specific innovation in order to get insight in the relevant factors of influence and implementing an e-health innovation in healthcare. Crucial part of this business model is the value of the CareRabbit services to the children and their family. This paper addresses the value in terms of the wellbeing of the children only.

2. Methods

The research is carried out as part of the pilot studies with the CareRabbit in paediatric departments in two different hospitals. The hospitals that participated were the Martini Hospital in Groningen and the MST in Enschede. The methods that are used are:

- Desk research on the influence of connectedness through an electronic device on the wellbeing of people and to describe the target group
- Perform a baseline measurement on children's wellbeing with children that are in the hospital, but haven't used the CareRabbit.
- Perform a measurement on children's wellbeing with children that used the CareRabbit for at least two days

With this information we will get a fair indication of the effect of the CareRabbit and the responses of the children. However, the validity of the outcomes is limited, since it is not a randomized trial in controlled circumstances.

Wellbeing is measured with the KINDL questionnaire (www.kindl.org), a validated list consisting of 24 questions [7]. KINDL was chosen because it can be used with children with the age of four years or older, it has a limited amount of questions in six categories (Physical wellbeing, Emotional wellbeing, Self-esteem, Family, Friends,

and School), and it is available in Dutch. For each category of children's questionnaires (4-7, 8-11, 12-16), a matching questionnaire exists for parents to indicate perception on their child's wellbeing. The questionnaire for the youngest children (4-7) is easier to fill in, even though help from an adult is desirable. The scores of KINDL can be normalized to a 0-100 point scale to make outcomes comparable. Missing values (mainly in the category School, since it was a holiday) are not included and scores on negatively formulated questions ("double negative") are reversed.

At each hospital, start-up sessions were organized with childcare workers, head of the department, IT staff and nurses. The project, pilot studies, and research were explained; CareRabbits were tested; and instructions were given on how to use the device and website. The control phase was executed first, for two months in both hospitals: first the researcher handed out the questionnaires, but eventually the childcare workers gave KINDL to children in the hospital eligible for participation. After the control phase was completed, the CareRabbit phase started: childcare workers handed out the devices, instructed parents and handed out questionnaires. Children that filled out one of the questionnaires got a small mascot or "gelukspoppetje" and a card to thank them for their participation and wish them health and luck.

3. Results

During the pilots 27 children used the CareRabbit and 32 children participated in the control group (27 of their parents participated). Of the CareRabbit group 12 parents and 11 children (34%) filled out a questionnaire. At the MST 23 children used a CareRabbit, at the Martini Hospital 4 children used one. Table 1 shows the background characteristics of each group of participants.

Table 1: Distribution on background characteristics of the CareRabbit group and the control group

Age	Parents				Children					
	4-7		8-16		4-7		8-11		12-16	
CareRabbit	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
#Participants	6	6	21	21	6	6	15	11	6	15
#Questionnaires	4	6	8	21	4	6	6	11	2	15
Boys	2	3	1	3	2	3	1	6	0	7
Girls	2	3	7	18	2	3	5	5	2	8
Average age	4,3	6,0	10,8	11,7	4,3	6,0	9,3	10,2	15,5	13,9
# brothers/sisters	-	-	-	-	1,3	1,7	1,7	1,3	1,0	2,5
Earlier admissions = 0	1	1	2	11	1	3	4	7	0	8
Earlier admissions = 1	1	4	1	4	1	1	0	2	0	2
Earlier admission > 1	2	1	5	6	2	2	2	2	2	5

Based on the information of the childcare workers, three children asked to participate in the control group refused. Four children offered a CareRabbit declined, because they found their current facilities sufficient; one boy of 15 said he considered himself too old for the CareRabbit. However, two girls age 15 and 16 used the CareRabbit at the MST and were enthusiastic about it. This means that depending on the specific child, the CareRabbit may be of value for children older than 14.

The childcare workers explained that the low amount of completed questionnaires was caused by not handing out the questionnaires and sometimes because (young)

children were too excited about returning home, and therefore couldn't concentrate on a questionnaire. The control period and CareRabbit period were approximately the same (10 weeks), however the CareRabbit period took place during the summer holidays, when most planned hospital admissions are postponed, and fewer children being admitted since the paediatric department is closed. The average age of the control group was slightly higher and more boys participated than in the CareRabbit group. This is consistent with perceived age of the target group of the CareRabbit. Childcare workers told that boys older than 12 were often not offered the CareRabbit or did not want to use it. Moreover, more children of the control group were admitted to the hospital before: this might indicate that more children of the control group have a long-term illness or serious condition. From here on, only the results from the questionnaires are analyzed, which for the CareRabbit group yields $N = 12$.

The results of our measurements shows, among others, that the difference between the CareRabbit group and the control group on their normalized scores for the KINDL is 2,5 points (66,8 versus 64,3) indicating that the CareRabbit group scores are slightly higher on wellbeing than the control group, but this difference is not significant. For the youngest children (age 4-7) the difference is larger: 12,3 points for parents and 17,5 points for the children. The difference for the parents' and children's scores together is 14,52; this difference is significant with 97% certainty ($t = 2,87$, $df = 7$). For the children separately the difference is 17,6 points with 90% certainty; for parents the difference of 12,3 is 70% certain. This might indicate that the CareRabbit has a positive influence on wellbeing for younger children. However, since the circumstances are not controlled, other factors might have an influence too.

The differences on the separate categories are minimal, except on School, where the CareRabbit group scores 0,4 points higher, and on Family, where the control group scores 0,3 points higher. These differences are not significant.

4. Discussion and conclusion

The number of questionnaires filled out in the CareRabbit group is low ($n = 12$), and it is difficult to generalize the conclusions based on this information. Besides that, other factors might have been of influence as well (e.g. personal circumstances) since both measurements were not done within the same group (i.e. control measurement and CareRabbit measurement with the same person), but between groups. However, all children and parents that actually used the CareRabbit valued it.

The children of the CareRabbit group scored slightly higher on the KINDL questionnaire than the children of the control group (66,8 versus 64,3). However, this difference is not significant, but it might indicate that the CareRabbit has an influence on wellbeing. For young children (age 4-7) the difference was larger (14,9), therefore suggesting that the CareRabbit may be more valuable for younger children.

Not much information is known on children that did not want to use the CareRabbit. As far as known three children (boys, older than 14) refused the CareRabbit, but it is not clear what their precise motivation was or what they would have thought of it when they had tried it. Furthermore, it is not known what children that were not offered a CareRabbit by the childcare workers (for example, because they expected that it would not be appreciated by older children >16) would think of it. In general, the approach of the childcare workers might influence the results, as they handed out most CareRabbits and questionnaires and their attitude is bound to be

different (e.g. enthusiastic, opinion on whether it was valuable for boys or older children, way of supplying). However, it is probably impossible to neutralize this effect in this type of research projects.

Almost all questionnaires were filled out at the end of the stay. Some of the questionnaires of the control group were filled out one or two days earlier, but never on the day of admission itself. A future improvement on this research would be to give both the control group and the experimental group a questionnaire at admission and at discharge. In this way, the effect of the hospital stay itself and their improved health on their wellbeing would be excluded and the effect of the CareRabbit can be measured more thoroughly. Future research directions regarding the CareRabbit should include a follow-up study, taking into account this improved research design, with a larger number of participants. In addition, first steps have been set toward the elaboration of a business model, which takes into account the demonstrated value to the stakeholders. Based on the experience and feedback during the pilot study, the applicability to other patient groups in healthcare, such as elderly people, might also be investigated to discover whether the use of ICT in an alternative and inviting shape and form can improve their social connectedness and wellbeing.

Given that this study was not limited in its approach but limited by practical issues, the small sample size has not refrained us from seeking publication at this stage. The results are positive and also show statistical significance. Furthermore all stakeholders (most importantly, the children, parents, and hospital staff) valued the CareRabbit. Therefore the study can be seen as a pilot study with positive results and thus invites researchers to do further research on social connectedness through the use of ICT. From a theoretical point of view, we have shown the applicability of a validated clinical instrument (KINDL) to assess the health and wellness outcome of the use of an e-health device. In combination with more traditional information systems approaches to assess the value of e-health applications, such as perceived usefulness and ease of use, this provides a richer methodological basis for future e-health research.

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